ONR Seabed Characterization Workshop

5-6 April 2011

George V. Frisk

Department of Ocean and Mechanical Engineering

Florida Atlantic University

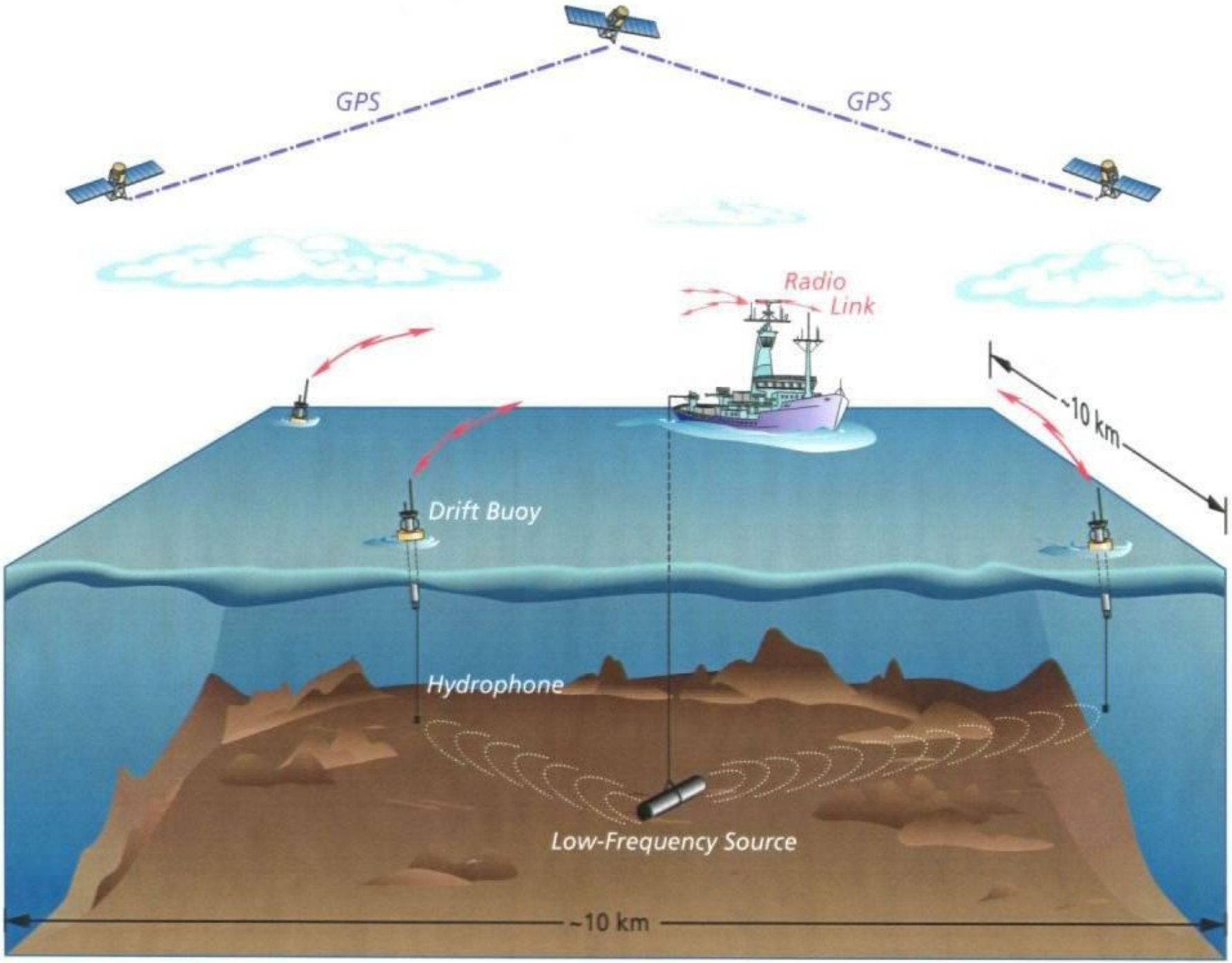
Dania Beach, Florida 33004

Cynthia J. Sellers

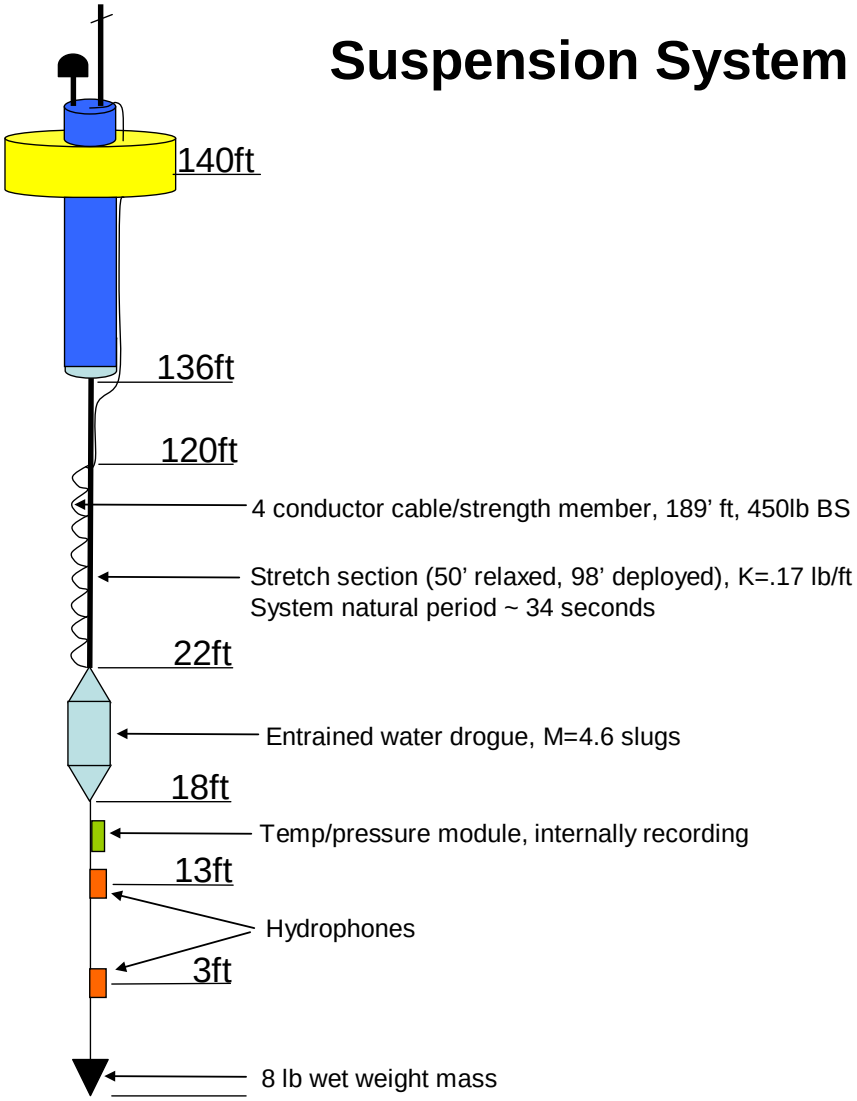
Dept. of Applied Ocean Physics and Engineering

Woods Hole Oceanographic Institution

Woods Hole, MA 02543

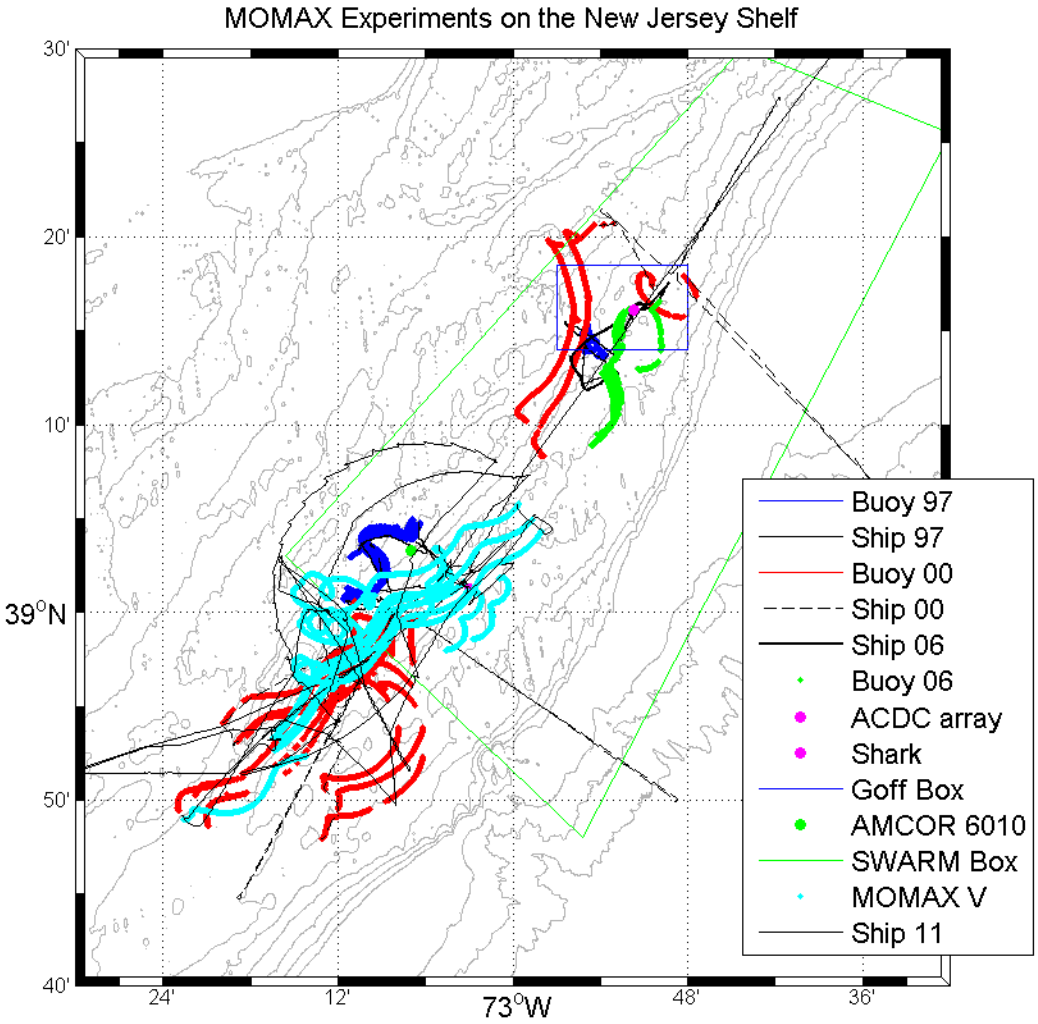

GPS
GPS
Radio
Link
~10 km
Drift Buoy
Hydrophone
Low-Frequency Source
~10 km

MOMAX 4 Drifter Suspension System



vdH, 2006

FLORIDA ATLANTIC UNIVERSITY



ONR RTP Experiment - MOMAX V - March 2011

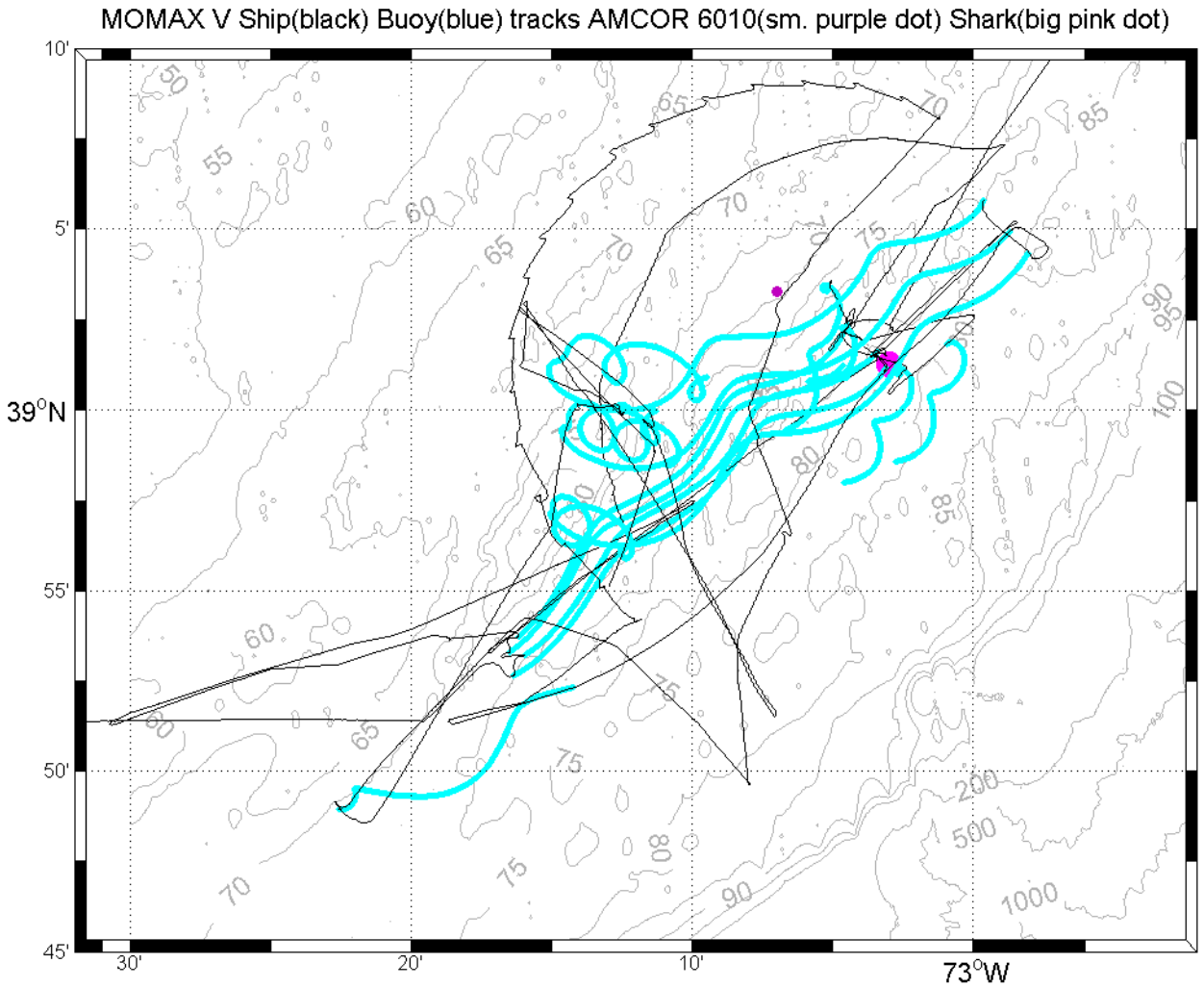
Frisk, Becker, Sellers *et al.*

FLORIDA ATLANTIC UNIVERSITY

Narrowband and broadband transmissions: 50-1000 Hz

- *Drifting and towed NUWC J15-3 source at 53 m depth*
- *Drifting and towed NUWC G34 source at 8 m depth*
- *Data received on 4 drifting MOMAX buoys, each having hydrophones at 61 m and 64 m depths*
- *Data received on several GPS-capable 53F sonobuoys with hydrophone at 61 m depth, in some cases co-located with MOMAX buoys*

CTD and XBT measurements indicate benign water column in SW06 experimental area


MOMAX V Ship(black) Buoy(blue) tracks AMCOR 6010(sm. purple dot) Shark(big pink dot)
10'
5'
39°N
55'
50'
45'
30'
20'
10'
73°W
50
55
60
65
70
75
80
85
90
95
100
200
500
1000

MOMAX V Lessons Learned & Recommendations

Perform experiment in late winter/early spring to ensure a homogeneous water column

– *This strategy avoids the negative effects of water column variability on the solution of the geoacoustic inverse problem*

Conduct experiment in a well-studied area that facilitates comparisons with previous measurements

– *The New Jersey Shelf remains an attractive area, but there may be other areas with a greater variety of sediment type (e.g., both hard and soft) that should be considered*

Incorporate the use of COTS sensors used by the operational Navy (e.g., sonobuoys)

– *This approach offers the opportunity for the development of geoacoustic survey methods that can be applied to large geographical areas in an operational Navy context*

FAU
FLORIDA ATLANTIC UNIVERSITY

Future Work

Conduct MOMAX experiment with large number of sonobuoys (e.g., 15-20)

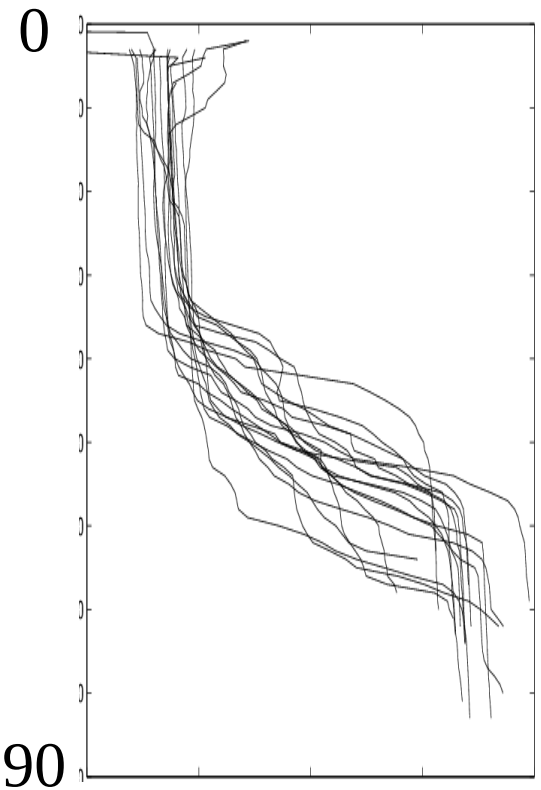
– *This approach will provide a 3D characterization of the normal mode field as well as an opportunity to invert for the 3D geoacoustic parameters*

Utilize the two-hydrophone data obtained on the MOMAX buoys to estimate the ratio of the depth-dependent Green's functions at the two receivers

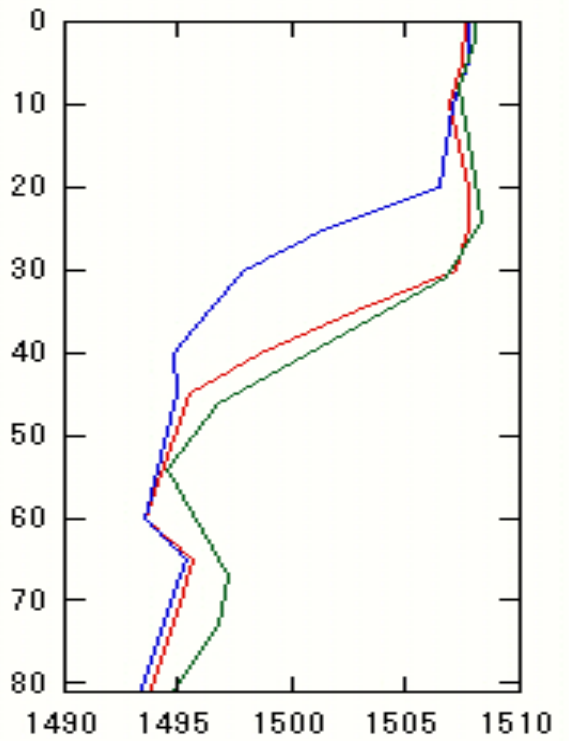
– *An estimate of the bottom reflection coefficient can then be obtained from the ratio of the Green's functions*

Year to Year Sound Speed Variation near SW06 site

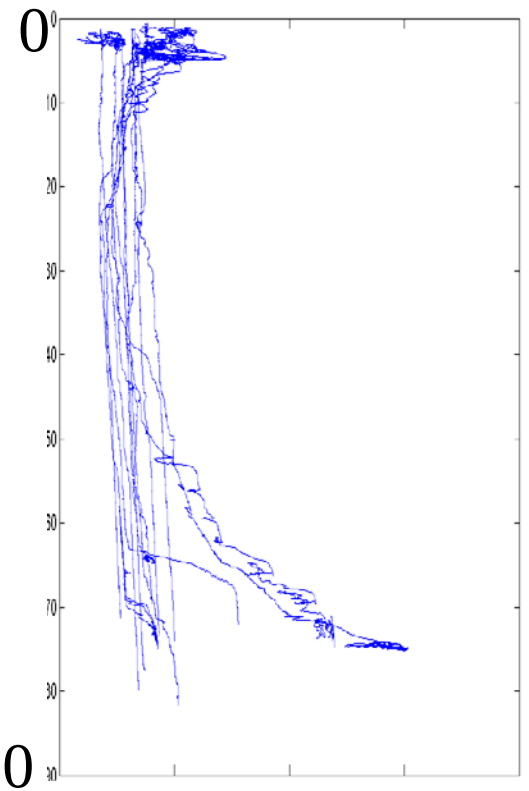
March 15-April 1, 1997



Oct 16-31, 2000



March 6-17, 2011



m/s

m/s